Herb
Sci. Staff

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ENTOPATH NEWS
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INTRODUCTORY

While this is being written rain and still more rain is putting the June rainfall, at any rate in the south of England, well above the monthly average. This wet, cold June follows an exceptionally cold and backward spring, which however was generally very free of damaging frosts, though half hardy trees and shrubs in the north suffered seriously during the hard winter. How great an effect all these climatic vagaries will have on insects and diseases remains yet to be seen. They clearly illustrate the impossibility of applying the lessons learnt one year automatically to the next.

The shell of the new wing to the Research Station at Alice Holt is nearly complete, and internal plumbing, electrical and decoration work is proceeding steadily. The seed store hopes to move in towards the end of the summer, but the remainder, which includes new laboratories for entomology and pathology, can hardly be ready before the end of the year.

FOMES ANNOSUS - THE PRESENT POSITION.

Our first number of this year was devoted solely to this disease. One thing we dealt with was the protection of crops by the treatment of stumps with creosote. We spoke of the manner in which the disease is spreading and increasing, and it is apparent that the longer we delay protection the more the situation will have deteriorated. However we decided to advise a preliminary introduction into forests where the disease is most advanced and the danger of rapid deterioration greatest. The idea of a routine measure to control forest disease on such a large scale is a new one in this country and we felt it was best to proceed slowly at first, and to sort out any difficulties which might arise, rather than run the risk of having a "ground nuts scheme" on our hands.

We have been visiting selected forests and making detailed studies of what is happening before making recommendations. This has meant that in introducing stump treatment we have not been proceeding just on general grounds, but on local evidence demonstrating the need for protection. Meanwhile some conservators have quite properly gone ahead independantly, where they judged that the situation warranted it. It is a matter of proceeding with reasonable caution, but remembering that we cannot afford to wait too long before making general decisions.

Although, even where there is little or no present infection, protection is very necessary in order to preserve this state of affairs, the forests in greatest danger are mainly situated in those parts of the country where there has been more widespread planting of conifers in the past. In this respect Scotland is in more danger than England, with Wales in a rather intermediate position. For instance East Scotland has a considerable past history of conifer planting and quite the worst and most widespread presence of Fomes. Here the spread and increase of the disease can be well seen and protection has now been introduced into most forests.

We hope to visit all Conservancies by the end of this year to report upon the general position and to make particular recommendations. At the moment all Scottish and Welsh Conservancies have made some start upon stump treatment, but inevitably some other conservancies have been rather neglected at this early stage. We applogise for this. Please do not think because your present state is not obviously threatening, and because we have for this reason rather left you alone, that the fungus is not potentially dangerous for you too.

Where protection has been introduced it has in general gone smoothly. Supervision has been good and both delay and incomplete application seem to have been largely avoided. Good supervision will always be necessary, but at least it has been shown that the operation can be done cheaply and well. In particular it has been found that where the thinning operation is carried out by contractors it is still possible to get stump treatment done satisfactorily and at little extra cost to the Forestry Commission. It is best included as a condition of contract. One practical point which has emerged from the practice of protection in East Scotland is the use of a

one gallon spouted and handled paraffin can as a form of non-spill bucket, the creosote being poured onto the stump and then spread around by means of a brush. This simple method has obvious advantages over an open bucket for rough and hilly ground.

ADELGES PICEAE ON ABIES GRANDIS.

Two species of Adelges, piceae and nusslini, are well-known pests of the Silver firs (see Forestry Commission Bulletin No. 26). It has been accepted until recently that their habits are as suggested by their common names: the "fir trunk aphid" for the former and the "fir shoot aphid" for the latter. German workers however, have lately satisfied themselves that there are, in fact, more than two Adelgid species associated with Silver firs and, further, that A. nusslini is not necessarily restricted to the young shoots. Whether this be so or not, it is certainly true to say that in this country shoot infestations are very much more damaging than stem attacks. Heavy attack by A. nusslini on the young growth causes defoliation, gouty swellings, crown distortion, and tree death. As is well-known, this type of attack is particularly damaging to A. alba. Stem attack, usually ascribed to A. piceae, is considered to be of less importance, and often of short duration. It has, however, been noticed both in Europe and in Canada that heavy infestation of the stem can produce the formation of a type of compression wood called "Rotholy".

From a Kent private estate, just recently, a report came in of difficulty experienced in sawing A. grandis which had been suffering from a heavy stem attack of A. piceae. Not only had the sawyer the greatest difficulty in cutting the logs at all, either by bow or circular saw, owing to hardness and pinching, but the converted material took on an immediate bow. Examination of the timber showed an almost complete lack of spring wood over the past 4-5 years' growth and all but the first few rows of cells in these annual rings were very thick walled. This seems to be a typical instance of "Rotholy".

Incidentally, this plot of A. grandis looked very healthy about 30 years ago and had shown the fastest growth of any species on the estate.

CAN WE BLAME WAINUTS.

There is quite a lot of evidence that the roots of walnut trees produce a substance, which is toxic to the roots of other plants, so that deep-rooted vegetation within the root zone of a walnut tree will sometimes die. Shallow-rooted vegetation escapes, because its absorption is mainly from layers above the walnut rooting zone. In many cases, however, one can see trees and shrubs growing quite unharmed in the immediate neighbourhood of walnuts, and it must be admitted that as far as we personally are concerned death around a walnut is something we still have to see. We should be interested to hear of anyone who has observed this phenomenon.

ELM DISEASE.

The surveys of Elm disease, caused by Ceratostomella ulmi, which were started in 1928 and carried on with some interruptions till 1955, have at last been written up and should appear eventually as a Forestry Commission Bulletin. The disease has declined since about 1938, both in the number of trees attacked and in the severity of attack on those trees which are affected. It is very difficult to suggest a satisfactory explanation for this decline. It has been suggested that in the earlier years the disease killed all the most susceptible elms and that the ones left are more resistant. Unfortunately experiments have indicated that many of the surviving elms are in fact very susceptible. Another suggested explanation is that the virulence of the fungus has declined, but again experiments have shown that this is not so. Scolytus beetles are responsible for carrying the spores of the fungus from tree to tree, and it is possible that the population of Scolytus beetles has fallen to a less dangerous level. In the nineteen thirties, when the disease was at its height, there were plenty of dying elms in which the beetles could breed. Such trees were often left standing because the market for their timber was poor. Wartime timber shortages meant that even the dead trees were cleared away. Since then a much better market for elm timber has resulted in the much quicker removal of seriously diseased trees. Possibly lack of suitable breeding places may have lowered the beetle population and thus lessened the ravages of the disease.

At any rate the level of the disease is now such that the planting of elms can once again be contemplated. We hope that the

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resistant Dutch clones now under test may provide a really safe answer for planting in parks and avenues, where the loss of even a single tree from the disease may be a nuisance. But in hedges and along roadsides it seems reasonable once again to encourage elm suckers to grow up into timber. Even if some of them become diseased, others will reach timber size. These will prove very saleable, provided the present good market for elm timber persists.

PINHOLE BORERS.

Pinhole borers, or Ambrosia beetles as they are sometimes called, damage timber after it has been felled. Their tunnels penetrate quite deeply into the wood and are characteristically dark in colour, the dark staining being caused by the growth of a fungus which the beetles carry into the tunnels and on which they and their brood feed. Ambrosia beetles are serious pests in the tropics and in western north America but in this country they are not usually thought of as forest pests. However, on a recent visit to the Ari Mill in Argyll we were shown some spruce which was very heavily infected by pinhole borers - so much so that some of the sawn material was being discarded as unsaleable. In this particular instance, the logs had been left in the forest for up to two years before being brought to the saw. A subsequent brief examination of some of the plantations in the vicinity revealed that a number of coniferous species were being attacked, and that some breeding was taking place in stumps. This latter site may be the source from which the beetles, in this case Trypodendron lineatum, spread to logs when these are available.

We know almost nothing about the forest relations of this species and we are now planning to investigate them in co-operation with the entomologists from the Forest Products Research Laboratories. We want to learn more about the distribution and incidence of attack, about the length of time after felling before the logs become susceptible to attack, about the influence of time offelling on attack, and so on. Possibly, if the problem warrants it, we may do some work on preventitive measures. In the meantime, it would be of great interest to us to hear if foresters in parts of the country other than Argyll have observed any attacks of this nature on softwoods.

NEOMYZAPHIS AGAIN.

After insect defoliation which does not kill the trees concerned, one of the questions that forest entomologists are often asked is "What incremental loss has this attack inflicted on the tree, or crop?". It is by no means an easy question to answer at all accurately since so many other factors, intrinsic and extrinsic, complicate the growth patterns of the trees. When defoliation has been severe, however, one would anticipate that it should be fairly easy to discern if an appreciable drop in increment has occurred even if it may not be possible to say exactly that such-and-such a percentage loss has taken place.

Two insects which in this country recurrently produce heavy defoliation without, usually, subsequent death of the trees concerned are the oak leaf roller moth and the green spruce aphid. Defoliation produced by the latter was severe in Sitka spruce crops in some parts of the country last year and we have taken advantage of this to set up a number of sample plots in various defoliated stands. The objective is to retain these for something like five to eight years, making annual assessments of the intensity of aphid attack on individual trees, and then to work out the incremental patterns of the trees, probably by stem analysis. To develop the technique of analysis we are at the moment studying stem samples from a Sitka spruce wood in Cheshire which we know was heavily defoliated by the aphid in 1952 and, probably, in 1938. We hope from these samples to be able to demonstrate that a loss of increment took place in the years following these known attacks, and also possibly to work out some method of detecting such losses without having to carry out a full stem analysis in each case.

A COMPLICATED STORY.

The complexity of some disease problems is well illustrated by a recent occurrence in Holland. In one district very serious dieback of poplars, sometimes resulting in death, has developed over the last few years. It was found that the disease started a few years after Japanese larch had been planted on a large scale near the poplars and sometimes as an understory to them. The full story of the disease is very intriguing. Larch is the alternate host of Melampsora rust of Black poplars, and so the presence of so much larch greatly increased the severity of this rust on the poplar leaves. Loss of leaves was so severe that there was some dieback

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of the twigs. The dead twigs were then invaded by the bark attacking fungus, Dothichiza populea. This fungus seldom attacks healthy poplars. Dothichiza then spread into the larger limbs, causing further dieback and even death. Since the larch can hardly be sacrificed, the only answer is to replace the poplar with varieties especially resistant to Melampsora rust, to Dothichiza or to both.

VIRUS DISEASES OF TREES.

Virus diseases are caused by organisms even smaller than bacteria, in fact so small that they cannot be seen even under the high power of an ordinary microscope. Viruses are responsible for many important diseases in agriculture and horticulture, particularly on crops which are propagated vegetatively such as chrysanthemums, raspberries or potatoes. In such plants they build up to a higher and more damaging level in each successive crop. It is mainly virus diseases that are responsible for the deterioration of strawberry stocks and the steady decline of potatoes if they are grown from home saved seed. It is obviously a danger to long-lived forest trees in that they also would allow viruses a sufficient period to build up to a damaging level.

Fortunately, though quite a large number of virus diseases have been recorded on broadleaved trees, mostly causing yellow mottling and sometimes distortion of the leaves, few of them are at all serious. So far there are only two really serious virus diseases of temperate region timber trees. One is the so called 'Phloem necrosis' of elm. This disease, which is so far confined to the United States, causes deterioration of the food conducting vessels, and later death of the whole tree. The other is birch dieback in the North East United States and East Canada, which was mentioned in our last number.

There is only one record of a suspected virus on conifers and that not in Britain. It involved yellow mottling of spruce needles. Unexplained symptoms, which could have been caused by virus attack, have been observed on conifers in Britain on numerous occasions, but there are other possible causes, and we still await definite proof that viruses do occur on conifers.

However, it is very probable that some at least of the diseases which we cannot explain, both on broadleaved trees and conifers, are/

are due to virus infection. The minute size of the organisms concerned makes proof of virus attack a complex and difficult undertaking, so that it may be quite a while before we can speak with certainty. In the meantime 'Perhaps it is a virus' provides a useful refuge for the pathologist in doubt.

PINE RUST TRIALS.

Cronartium ribicola and Melampsora pinitorqua, the White pine blister rust and the Pine twisting rust, are the two important rusts of pine in Britain. Cronartium attacks five-needle pines and requires currants or gooseberries as an alternate host, Melampsora attacks two-needle pines and requires aspen as an alternate host. The susceptibility of various pines, of cultivated varieties of resistant currants, and of varieties of aspen and closely related species, is being tested in garden trials started at Alice Holt in 1954.

In the Cronartium test area a very heavy infection was rapidly formed on Pinus strobus and black-currants. Seven varieties of resistant currants have been tried and all have remained immune, these, however, are of little practical value in this country. Of the pines so far tried, only P. peuce, the Balkan pine, has been unaffected. P. halfordiana, P. monticola and P. flexilis have all been infected, while P. excelsa, the Himalayan pine, is showing a few swellings typical of the disease, though no blisters have yet formed. Grafts of six resistant P. strobus scions, originally from the United States, were introduced last year, and any that prove successful will be used for breeding resistant strains.

It was surprisingly difficult to infect Scots pine and aspen in the Melampsora test, symptoms first appeared last year in the fourth growing season, though infected material was introduced each year. So far Maritime pine, P. pinaster, appears more susceptible than Scots; P. resinosa, P. radiata and Corsican pine have remained unaffected. The American aspens, Populus tremuloides and P. grandidentata, appear completely resistant, while there is considerable variation in susceptibility between individuals of the hybrid P. tremula x tremuloides. More pines and poplars have been introduced this year and a wide range of both will eventually be tested.

REMINDER!!!

Specimens and Descriptions to be sent direct to either the Pathologist or the Entomologist, the minute preferably being in the package with the material.

Pathologist	:	FOREST RESEARCH STATION,
	:	Alice Holt Lodge,
Entomologist	:	Wrecclesham,
	:	FARNHAM, SURREY